REMARKS

In view of the preceding amendments and following remarks, reconsideration of the present application is requested. In the Office Action claims 91-115 were allowed and claims 1-90 were rejected under 35 U.S.C. §112.

In the interests of making the subject matter of this invention more clearly understood by the Examiner, the applicant has requested an amendment to the specification reiterating wet anisotropic etching of silicon wafers and the situation in which an initial cavity is formed using some technique other than wet anisotropic etching, followed by use of wet anisotropic etching. This additional description, which includes additional figures, is intended to reiterate what angles are referred to in the claims, in particular in independent claims 1 and 56. No new subject matter is included but the description is submitted in an attempt to address the concerns expressed by the Examiner. The discussion relates to the angles between various planes in the crystallographic structure of silicon, for example {100}, {110}, and {111} planes, and between the surface of a silicon wafer and the walls of the cavities etched with both wet anisotropic etching techniques as well as techniques other than anisotropic etching.

In the Office Action the Examiner asks several questions pertaining to independent claims 1 and 56.

First, the Examiner asks "Is the top surface of the Si wafer restricted to being in the <111> plane or can it be in another plane such as <100>, <110>, etc.?" (The applicant recognizes that the notation commonly used in the art

when discussing crystallographic structure can be confusing. In order to avoid any confusion which may arise, a brief review of the adopted convention is given here. For families of planes in the crystal lattice the notation is such that "curly brackets" are used, for example "{111} planes"; when referring to a specific plane from a family of planes, parentheses are used, for example the designation of a silicon wafer as a "(100)" wafer is made because it's surface is an individual (100) plane (from the family of all {100} planes in the wafer. When the numeric descriptors are enclosed in "angled brackets", reference is being made to directions in the crystal lattice, for example "<100> directions"; a specific direction appears in "square brackets", for example the "direction [100]". Finally, the applicant notes that the convention is such that directions are defined by the planes to which they are perpendicular, for example <111> directions are perpendicular to {111} planes.) The applicant wishes to point out that the language used in both independent claims 1 and 56 is such that reference is made only to "... surface of a silicon wafer..." This is because the claimed invention is such that there are *no* restrictions as to what type of silicon wafer is used; that is the top surface of the wafer could be a {100} plane, a {110} plane, etc. The method for fabricating microstructures using wet anisotropic etching of deep cavities in thick silicon wafers applies to all types of silicon wafers. (However, the applicant points out that, as should now be clear, since etching rates in directions perpendicular to {111} planes can be several hundred times less than in other directions, if the silicon wafer were to have a (111) plane at its surface then wet anisotropic etching alone could not effectively be used to form a

cavity since the etch rate would be unacceptably slow. However, even for a (111) silicon wafer the method of the current invention, wherein an initial cavity is formed using an etching technique other than wet anisotropic etching prior to the etch step using wet anisotropic etching, can be used to successfully etch a deeper cavity in the silicon wafer.)

The Examiner's next question is: "Does the anisotropic etch which is claimed by the applicant proceed along the <111> plane of the wafer (i.e.-parallel to the <111> plane) or is it perpendicular to it?" Anisotropic etching proceeds in all directions; however, in <111> directions – i.e., perpendicular to {111} planes – it proceeds at a rate which can be several hundred times slower than in other directions. This is why the {111} planes effectively form "walls" of cavities formed by wet anisotropic etching, and this is why the etch depth achievable using wet anisotropic etching is limited by the size of the opening formed on the wafer surface and by {111} planes. As explained in the specification, if a first etching step is performed using some etching technique other than wet anisotropic etching, then, depending on whether the walls of the resulting initial cavity have tangents at the wafer surface which form angles greater than or lesser than the smallest angles formed by {111} planes and the wafer surface, a subsequent etching step using wet anisotropic etching may result in an etch depth greater than that which would have been achieved if no initial cavity had been formed by an etching technique other than wet anisotropic etching. If an initial cavity is formed with an etching technique other than wet anisotropic etching, then the etch depth achievable using a subsequent step of wet anisotropic etching will be

greater than that which would be achieved had no initial cavity been formed if, as is claimed in claims 1 and 56, the initial cavity is such that "at least part of its formed side walls [are] at an angle larger than the minimum angle between {111} crystallographic planes and the surface of the wafer".

The Examiner's final question is "What possible planes, and angles can the wafer be etched at in each step[?]" The applicant believes this question has been answered. However, to be absolutely certain, the applicant reiterates that the wafer can be etched in all directions in each step. However, during any wet anisotropic etching step, whether it be preceded by a step of etching using any technique other than wet anisotropic etching or not, the etching rate in <111> directions (i.e., perpendicular to {111} planes) can be several hundred times less than in other directions. Therefore, during wet anisotropic etching, etching is effectively carried out in all directions except <111> directions since the etch rate in those directions can be so much slower than in all others.

The applicant sincerely hopes that the foregoing is fully responsive to the Examiner's questions. The amendments herein comprise only reiteration in the specification – which involves no new subject matter – and various minor editorial alterations to address informalities, which again involve no new subject matter.

Accordingly, applicant respectfully contends that claims 1-90 are in condition for allowance along with previously allowed claims 91-115, and such action is respectfully requested.

If the Examiner is of the opinion that a telephone conference with applicant's attorney will expedite prosecution, such conference is invited.

Respectfully submitted,

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